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Acute Enzootic Hæmorrhagic Septicæmia of the Buffalo.*

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Introduction.

When it was suggested that I should write a paper for discussion at this meeting, I was somewhat at a loss concerning the choice of a suitable subject, as my experience of the Orient was naturally a very limited one. However, the recent incidence of buffalo disease in Perak South seemed to indicate to me that I could not do better than commence with material fortunately, or rather should I say unfortunately, brought to my door. Should my theme of election therefore fail to prove a happy one, I may perhaps be allowed to plead extenuating circumstances on the ground that the fates have ordained it.

Hæmorrhagic septicæmia, as will be observed from a perusal of recent weekly reports of contagious diseases, appears to be on the increase in Malaya and this fact, coupled with the knowledge that it is one of the commoner diseases of our northern neighbour Siam, may perhaps justify the hope that the subject may prove not uninteresting, and that at least one result of the paper may be the promotion of a good discussion.

Much of what is contained in the following sketchy dissertation may of course be found in any text book, but, as the scourge is a comparatively new one to Malaya, I decided that, short of classical embellishments, the disease might, for an association meeting, profitably be described in general outline, before giving a brief résumé of the actual outbreaks experienced in Perak South. The disease has not to my knowledge been previously described by any Malayan writer and, so far as I am aware, it is only within the last triennium that the *Bacillus bubalisepticus* has clearly demonstrated in Malaya that, quite apart from its saprophytic existence, it can play a paramount rôle in the rapid extermination of large numbers of susceptible buffaloes.

Synonyms.

The more common alternative terms applied to the condition are Barbone, Buffalo Disease, Buffalo Cholera, Pasteurellosis and, in Malaya, the familiar and comprehensive Hawa Kerbau.

Definition.

The buffalo variety of hæmorrhagic septicæmia may be defined as an acute or peracute infectious septicæmia of the buffalo, characterised by larnygeal, pleuropueumonic, and gastro-intestinal symptoms, accompanied by dyspnœa and severe asthenia, and followed by rapid dissolution.

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History.

The enzootic type of the disease was, I believe, first reported in Malaya in 1925, although sporadic cases of the subacute type had been previously known to occur. The disease in buffaloes had been recorded in Italy in 1886, and in Hungary in 1889, in both of which countries the œdematous type of the disease appears to have been commonly encountered, whereas in Malaya the thoracic type would appear to be the rule, œdema of the intermaxillary space, extending to the sternal region being almost invariably absent. The disease is regularly reported from Siam under the familiar name of Barbone.

Occurrence and Seasonal Incidence.

In most countries the disease is said to occur in wet marshy localities where large numbers of buffaloes are kept together, and in this respect the findings in Malaya must of necessity be similar, as marshy wallows might almost be said to be the natural habitat of the buffalo, especially the Malay buffalo.

It may be noted, however, that in Malaya such outbreaks as have been recorded have occurred during the wetter periods of the year, but as the outbreaks to date have been relatively few in number, one is hardly justified in claiming that the disease in Malaya has a definite seasonal incidence.

The disease is supposed to be transmissible to the wild pig, which is said to be susceptible to the infection, although there appears to be no Malayan record of wild pigs being affected with hæmorrhagic septicæmia during an outbreak of the disease in buffaloes. In my small experience of the disease, I have not heard of any cases occurring in the pig, but only in the case of one outbreak were wild pigs definitely known to exist more or less in the immediate vicinity, and the game warden informed me that he had not found any evidence of porcine mortality in his area.

One buffalo carcase had been obviously attacked overnight by some carnivor, but whether the invader was a pig or a dog I could not of course definitely ascertain, although it was the opinion of the owner that the marauder was a wild pig.

In Perak South the disease occurred at Sungei Dalam, near Ipoh, in the month of December, 1925, at a kampong on the Gopeng Road near Ipoh in May, 1927, and at Kampong Chendrong about four miles south of Batu Gajah, Gunong Pari and Kampong Kling, both about twelve miles north of Ipoh, in October, 1928. It may be noted that each affected kampong was situated near the banks of a river or river tributary.

Etiology.

The pathogen of the condition is the *Bacillus bipolaris septicus* (*bubalisepticus*) whose general characteristics conform to those of the Pasteurella group, *i.e.*, the bacillus is a short, immobile, polymorphous, non-sporulant, capsulated, gram-negative rod about 1 inch in length,

which, with aqueous solutions of the ordinary aniline dyes, stains deeply at the poles, and faintly or not at all in the centre. It appears to be a facultative ærobic saprophyte, and its toxin is said to be methyl guanidin. In blood smears it has rounded ends and it may also occur in the form of a coccus or diplococcus. Its length may be considerably more than 1 inch. For general blood examination, Leishman's stain is eminently suitable, the bacilli appearing blue in a pink background of red blood cells.

Pathogenicity.

Variations in the virulence of the bacillus occur, but most animals appear to be susceptible to that variety of the bacillus which is naturally pathogenic for them, and strains pathogenic for one species of animal are not necessarily pathogenic for other species, although sometimes this is the case, *e.g.*, the wild pig is said to be susceptible to both buffalo and bovine strains of the bacillus. Moreover, the virulence of the bacillus is said to be exalted for another species of animal by passage through the body of that species, being also simultaneously exalted for the species for which it was originally naturally pathogenic. 'In this connection it is an interesting speculation to consider whether it may be possible—although no Malayan data are available—that virulent outbreaks of the disease among buffaloes have some relation to passage of the virus through the wild pig, with consequent exaltation in virulence. The mysterious factor which causes an attenuated pathogenically dormant bacillus—in other words a saprophyte—suddenly to assume temporary pathogenetic characters does not appear to be understood, and it is simply a matter for speculation whether heavy rain—as might possibly be assumed from the seasonal incidence of the few Malayan outbreaks—has any influence, direct or indirect, in the genesis of this pathogenicity.

The common susceptible laboratory animals are the mouse, guinea-pig and rabbit, the latter being considered especially susceptible and responsible for the alternative term *Bacillus cuniculicidus* being applied to the pathogen. In my experience, rabbits and guinea-pigs, after intraperitoneal inoculation with virulent blood, die in anything from three to twelve hours. I have no evidence to show that cattle are naturally, or otherwise, susceptible to the buffalo strain of the bacillus, but such evidence as I have, namely, a few cattle stabled and grazing in the immediate vicinity of the disease, seems to be negative, in that no cow or bullock was affected, and no cow or bullock was inoculated with antiserum.

Pathogenesis.

The pathogen may gain entrance to the susceptible animal organism by means of small breaks in the continuity of the skin, and it is therefore quite conceivable that a large number of buffaloes wallowing in the same swamps could become infected in this manner from a common source, or even from each other. Infection by ingestion, however, is considered to be the natural method and is in fact stated to be the common avenue of infection. Artificial feeding of cultures, on the other hand, is alleged to be harmless, and is actually said to produce immunity to subsequent subcutaneous injections of virulent cultures. Once the bacillus has gained entrance to the animal body, it attacks the organs more susceptible to its effects, which organs, in Malaya, appear to be the lungs with their associated structures; the heart and pericardium, the abomasum and the small intestine.

Pathological Anatomy.

The necropsy reveals distinctive lesions in the larynx and trachea in the form of acute inflammation of the lining membrane and the presence of a quantity of a straw-coloured, frothy, semi-gelatinous or plastic exudate, which explains in part the dyspnœa and stertorous respiratory sounds often heard during life. On opening the chest cavity, a quantity of gelatinous yellow exudate is seen, part of the exudate being usually fibroplastic in character—we find, in fact, a fibroplastic pleurisy. On incising the lung, there is found evidence of interlobular pneumonia with marked hyperplasia and œdema of the interlobular connective tissue. The mottled or marbled appearance of the cut section reminds one forcibly of the findings in contagious pleuropneumonia. Affected portions of the lung sink in water, and all affected parts, contrary to what is found in contagious pleuropneumonia, appear to be in the same pathological stage of development. Incision of the pericardium reveals a quantity of straw- or amber-coloured exudate, and there may be also a plastic or fibroplastic pericarditis. Whether this pericarditis has any direct causative relation to the submaxillary and sternal œdema found in subacute cases is a matter of interest, although perhaps not of moment. The abomasum, on being incised, reveals acute abomasitis extending into the duodenum, and in most cases the mucous membrane is uniformly beaf-steak red in appearance. The spleen, liver and kidneys do not show well-marked macroscopic changes, but there may be slight swelling of the spleen and acute inflammation of the gall bladder.

Incubation Period.

The incubation period is said to be two days, and this seems compatible with clinical findings in connection with serum prophylaxis, which will be discussed later.

Symptomatology.

Unequivocal signs do not always exist and often the first indication of the presence of the disease is the animal's death. It is not uncommon to find from the anamnesis that several animals were suddenly and simultaneously found dead without previous signs of illness. However, in less acute cases there is observed inappetance, slight nasal discharge, dyspnœa with stertorous respiration, short dry painful cough, grinding of the teeth, constipation, slight injection or yellowish discoloration of the conjunctival mucous membrane, marked asthenia, and finally, a tendency to assume the recumbent position, when death rapidly ends the scene without a struggle.

Course and Prognosis.

The affected animal usually lives from eight to fifteen hours after the appearance of the prodromal symptoms, and death is the rule. Exceptionally, the animal may live for two days. The disease is certainly a spectacular one, it being quite common to see several buffaloes apparently well in the morning, in their graves in the evening.

DIAGNOSIS.

The diagnosis presents little or no difficulty, ample *post-mortem* material being usually available. If one learns from the anamnesis that several buffaloes have been suddenly found dead at the same time one may with a fair amount of confidence suspect that the *Bacillus bubali-septicus* is at work. During life, the outstanding diagnostic features are the rapid course, grinding of the teeth with constipation, marked asthenia, short dry cough and rattling respiration, with acute dyspnœa and signs of pleuro-pneumonia.

The *post-mortem* diagnostic features are, in order of necroscopic progression :—

(1) Œdematous infiltration of the tissues in the region of the intermaxillary space, extending to the sternum.

(2) Inflammation of the laryngo-tracheal mucous membrane, the trachea and bronchi being usually filled with a yellowish frothy or semi-gelatinous exudate.

(3) Plastic or fibroplastic pleurisy.

(4) Œdematous infiltration of the interlobular connective tissue of the lungs, and areas of interlobular pneumonia of the same pathological age.

(5) Pericarditis, often plastic or fibroplastic in character.

(6) Inflammation of the abomasal mucous membrane, extending often into the duodenum.

(7) The *Bacillus bipolaris septicus* can usually be found in films from the heart blood.

DIFFERENTIAL DIAGNOSIS.

The disease is distinctive and so spectacular that the question of differential diagnosis hardly arises. To my mind, the only diseases which might possibly be confused with it are anthrax, contagious pleuropneumonia, malignant œdema, blackquarter and rinderpest. The differential diagnosis in the case of anthrax, malignant œdema and blackquarter is immediately settled by the autopsy and requires no explanation ; in the case of pleuropneumonia, apart altogether from the fact that it is an insidious and slow-spreading disease, the areas of interlobular pneumonia are of different pathological ages, no bacilli are found in the blood, and laboratory animal inoculation is negative. In rinderpest we find inflammation of the fourth stomach with or without mouth lesions, but there is no fibroplastic pleurisy or pericarditis and no marbling of the cut lung surface, nor is the trachea filled with yellow frothy exudate. Diarrhœa is not found in acute hæmorrhagic septicæmia of the buffalo, nor is there acute injection of the conjunctiva during life. In rinderpest the spread is relatively slow. In hæmorrhagic septicæmia the disease remains localised and does not appear to spread beyond the affected "Kampong." If any doubt exists, the finding of the bipolar bacillus in heart blood, or, better still for the occasional bacteriologist, the inoculation of a rabbit with blood, will rapidly dispel any illusions which may exist.

THERAPEUTICS.

Treatment, as one may readily understand, is hopeless, since the fatal termination occurs so rapidly. I have seen mentioned that the intravenous injection of an immune serum may be tried, but I have tried specific anti-serum subcutaneously (70 c.c.) on a case in the very early stages with no temperature or other observable sign of illness, apart from slight inappetence, without result. Further, when practising serum prophylaxis I have found deaths occur from the disease one and two days after inoculation, which would point to the conclusion that not only is an immune serum ineffective after the appearance of symptoms but that it is also ineffective if injected during the incubation period.

PROPHYLAXIS.

Since the bacillus is a facultative saprophyte known to exist in certain soils, the first line of defence is to move the healthy buffaloes on to fresh pastures if this can be done, but it is generally impossible, from the nature of their habitat and mode of life, to reach any definite conclusion as to the infective locality. Moreover, stabling and stall feeding—which I think would be an excellent measure—of a large number of buffaloes present both practical and imaginary difficulties not easily overcome in the East.

Needless to say, the sick should be immediately isolated, although it appears to be a moot point whether infection is transmitted direct from animal to animal, or whether all animals are infected from a common source. They may be conveniently isolated near the proposed graveyard.

In serum therapy it would appear, from such small experience as I have had, that we have a valuable means of combating the disease, in spite of the fact that serum would seem to be ineffective if exhibited during the prodromal stage or even subsequent to the time of actual infection by the organism. The incubation period being short—and I assume it is up to two days—one may expect, if serum is used immediately, to get cases for a further two days, after which passive immunity should be firmly established for the herd. This theoretical conclusion is in accordance with practical experience gained in outbreaks of the disease in Perak, where, in a herd of thirty-five inoculated buffaloes two contracted the disease within two days of inoculation, and in another herd of one hundred and twelve inoculated buffaloes one died within two days of inoculation. No further deaths occurred in either group.

I have no data to show how long the bacillus may remain pathogenic in any given area, so that, theoretically, serum inoculations should be repeated every fourteen days, or, better still, the passive immunity conferred by the serum should be converted into an active one by the exhibition of vaccine. The ninth day subsequent to serum inoculation would appear to be a convenient time for vaccine treatment, as it requires some four days for the active immunity to become established. There is, unfortunately, a practical difficulty in the way of vaccine therapy, namely, the vaccine is stated by the makers to be unsuitable for use three months after despatch from their laboratories, which means that one would have to renew one's stock of vaccine quarterly and perhaps never have an outbreak of the disease, so that there would be a constant waste of vaccine. Unfortunately, or rather fortunately, we do not have definite areas in Malaya as in India, where we may expect the disease to appear yearly, so that routine prophylactic vaccination cannot be advantageously practised. Serum, on the other hand, retains its potency for two years if kept on ice.

The dose of serum recommended by the makers is 20 c.c. and upwards for buffaloes, but, partly with a view to

conferring a passive immunity of more than fourteen days' duration, and partly following the dictum of reliable therapeutists in connection with dosage in general (if you wish results give a sufficient dose and you will not be disappointed). I would recommend that 40 c.c. to 50 c.c. be given to Malay and Indian buffaloes. These were the doses used in the Perak outbreaks.

Mr. P. G. Short, veterinary surgeon, Perak South, has informed me from his previous experience of the disease, that a " Kampong " can be safely restocked within three to four weeks of the last death.

To recapitulate, practical prophylaxis consists in moving the animals to fresh grazing grounds and immediately inoculating the whole herd with anti-hæmorrhagic septicæmia serum, using a sufficently large dose to ensure a strong and fairly lasting passive immunity. To the bolder of my colleagues I would recommend that two or three days after serum inoculation the animals be grazed over the suspected infective area so that a natural active immunity might perhaps be established.

Quarantine Measures.

The fact that the disease does not show any tendency to spread over wide areas but appears to remain confined to the affected " kampongs," renders the institution of rigorous quarantine measures unwarrantable. In Perak South the practice is to allow grazing within, say, half a mile of the owners' premises, provided there are no buffaloes from neighbouring healthy herds using the same ground. In the case of draught-buffaloes work is allowed provided the animals are inoculated, but they must return to their stables in the evening so that the census may be checked. Any cattle in the area are allowed to work without restriction provided they are stabled at night. Export of animals from the affected area, an expedient dear to the heart of the Malay, is prohibited.

The Outbreaks in Perak South.

I am indebted to Mr. Short for facts and figures supplied in connection with the outbreaks of 1925 and 1927.

i. Kampongs Sungei Dalam and Gunong Terendam (including Ulu Piah) :—

The outbreak of the disease at Gunong Terendam and Sungei Dalam, both places situate about eight miles south of Ipoh on the Gopeng Road, and the habitat respectively of twenty-two and fifty-one milch buffaloes of both Malay and Indian breeds, appears to be the first recorded occurrence of enzootic hæmorrhagic septicæmia in Perak. The animals from both places grazed together on the same pastures, and the first announcement of the presence of the disease was the information received on December 3rd, 1925, that eight buffaloes had been found dead at Gunong Terendam that morning, without previous evidence of illness. On December 4th, two more animals died at Gunong Terendam and three at Sungei Dalam ; on the 5th, five at Gunong Terendam and two at Sungei Dalam ; on the 6th, four and three respectively ; on the 7th, one and four respectively ; on the 8th, one and one respectively ; and on the 11th one at Sungei Dalam. This ended the combined outbreak, thirty-five cases—twenty-one out of twenty-two buffaloes at Gunong Terendam, and fourteen out of fifty-one buffaloes at Sungei Dalam—having occurred in nine days.

(b) Necroscopic examination of nineteen cadavers revealed similar lesions in all, but it was only after prolonged and diligent search that the *Bacillus bubalisepticus* could be discovered in blood films, so that—the disease being an entirely new one to Perak—a definite diagnosis of hæmorrhagic septicæmia could be confidently made.

(c) On December 7th, one buffalo died of hæmorrhagic septicæmia at Ulu Piah some two miles distant from Sungei Dalam, and it was discovered that this buffalo had visited the infected kampongs at Gunong Terendam, and had then been taken home again. The owners at Ulu Piah were warned of the dangers of allowing their animals to go near the Sungei Dalam and Gunong Terendam grazing grounds, but, in spite of this warning, they apparently took advantage of the absence of buffaloes from these pastures surreptitiously to graze their animals there, and on 16th December their imbecility was rewarded with the death of six buffaloes at Ulu Piah, followed by two more deaths on the 17th, two on the 20th, and one on the 23rd. This ended the Ulu Piah outbreak, twelve animals having died out of a total collection of thirty-five buffaloes. There were also forty-one cattle—cows and bullocks—on the Ulu Piah premises, but none of these contracted infection.

(d) The average duration of illness in the individual animal throughout the whole enzootic was about twelve hours, and no affected animal recovered. In this outbreak, some cases showed evidence of local œdema and, in all carcases examined, the typical *post-mortem* findings of hæmorrhagic septicæmia were manifest. As, naturally, no one anticipated the sudden advent of this disease, no specific antiserum was available, and one had therefore to be content with the institution of general prophylactic and quarantine measures, which consisted largely in isolation of the sick, the healthy animals being allowed to graze in the immediate neighbourhood of their stables, avoiding, as far as could be judged, the previous grazing grounds. Export of animals from the area was prohibited.

(e) At Semakong and Kopisan, kampongs both adjoining Ulu Piah, there were one hundred and seventy-five buffaloes and two hundred and ninety-four cattle. These were not allowed to graze near the suspected pastures, and no cases occurred there.

ii. Kampong on the Gopeng Road.

On 6th May, 1927, during a particularly wet spell, word was received that four baffaloes had been found suddenly dead at a kampong on the Gopeng Road, about three miles south of Ipoh. There were, including the dead, fifteen Indian buffaloes stabled in the kampong, and in three days' time the outbreak was over, eleven animals having died, while the remaining four did not contract the disease. The usual *post-mortem* findings were seen in this outbreak, and the average duration of illness was from twelve to fifteen hours. The usual quarantine and prophylactic measures were instituted.

iii. Kampong Chenderong.

There was at Kampong Chenderong, situated about four miles south of Batu Gajah on the Tanjong Toh Alang Road, a group of thirty-three Malay buffaloes belonging to various more or less related Malays. On the 3rd October, 1928, word was received that three animals, apparently

well the previous night, had been found suddenly dead that morning. Necropsy revealed in all three cases the usual features diagnostic of hæmorrhagic septicæmia, with no intermaxillary or sternal œdema. On the 4th October, five more animals died under similar circumstances; on the 5th, another six; on the 6th, one; on the 7th, two; on the 8th, one; on the 9th, two (one of which had been ill for three days); on the 10th, one; and on the 13th, one, this latter having been ill for two days. This virtually ended the outbreak, but two buffaloes belonging to one owner had intentionally been allowed to escape into the woods, the owner subsequently alleging that it was impossible to catch them. On October 21st, one of these was found dead, and the other, which had now become genuinely wild and had broken through several traps, was seen roaming at large in the woods six weeks later.

(b) Films from the heart blood of buffaloes dead of the disease revealed the causal organism, but in some cases the bacilli were not present in appreciable numbers. The bacteriological diagnosis was confirmed by a medical worker. Intraperitoneal inoculation of a rabbit with virulent blood resulted in the rodent's death in convulsions twelve hours later, appreciable signs of illness being first observed some six hours after inoculation.

(c) The buffalo owners, influenced no doubt by the old governing "ketua," persistently refused to have the contact animals inoculated, arguing that, the visitation of the disease being the will of Allah, there was no advantage in inoculating them; they were, however, quite keen, in spite of Allah's will, to allow medicinal treatment of the sick or even to have them inoculated. One day, when the ketua was absent, I persuaded one owner—a woman—to allow me to inoculate her four buffaloes next morning. On arrival, I was told that three of them had broken loose and escaped, but although suspicious of the sinister influence of the ketua having been at work overnight, I decided to inoculate the remaining one, partly for my own edification and partly to justify my arrival there at 8 a.m. The owner herself was absent, but I was assured that the buffalo was perfectly healthy, and as it did not appear to be particularly friendly towards me, I had to be content with this assurance. To satisfy my suspicions, however, I took the animal's temperature, and having found this normal, I inoculated it without further ceremony, using a dose of 70 c.c.s. serum subcutaneously. Two days later the buffalo, which was about six weeks' pregnant, aborted and died. *Post-mortem* examination revealed the typical lesions of hæmorrhagic septicæmia. As I was leaving the kampong I met the owner and explained to her that the buffalo had died from the disease and not from abortion, whereupon she unblushingly informed me that she was already aware of this, as the animal was sick before I inoculated it. My clinical prestige, I felt, was somewhat shattered, but I had the satisfaction of knowing that my tentative belief in the possibilities of serum had not yet suffered the same fate.

(d) Of the twenty-three fatalities, fourteen appear to have been ill for from six to twelve hours, six for about twenty-four hours, one for two days, and one for three days. The remaining case was found dead in the woods, and no one knew exactly when it died or how long it had been ill. No sick animal recovered, and in no cases was any sign of local œdema observed.

(e) Quarantine and preventive measures consisted in grazing the animals near the premises of their respective owners, and tying them up at night. Immediately an animal showed any sign of sickness it was isolated close to the approved graveyard. Export of animals from the affected kampong was prohibited.

iv. Gunong Pari (first outbreak).

On Sunday, 21st October, information was received from Gunong Pari, situate some twelve miles north of Ipoh, that a female Indian milch buffalo and a buffalo calf had been found dead in the stable early that morning, without previous signs of illness having been noticed. The total number of buffaloes—milch animals and calves—in the immediate vicinity was forty-eight, including the dead.

(b) *Post-mortem* examination of the deceased animals revealed intense gastro-enteritis only. In both cases the heart, lungs and tracheal mucous membrane appeared normal. The owner said he was on friendly terms with his neighbours, and with the Chinese on the adjoining mine, so that malicious poisoning was to some extent ruled out. Unfortunately, I had no small animal with me for a test inoculation, and microscopical examination of the heart blood was negative. Diagnosis was expectant. Next day four more buffaloes were reported dead, so I went to make *post-mortem* examinations, this time armed with a rabbit. Autopsy in all four cases revealed the typical diagnostic features of hæmorrhagic septicæmia, with no local œdema. The rabbit was inoculated intraperitoneally with 4 c.c. heart blood, and died in convulsions two hours later, the bacilli being found in its heart blood. Microscopical examination of films from the heart blood of the dead buffaloes was positive, but the bacilli were not equally abundant in all cases. Another buffalo became sick on the same afternoon and died the same night. On Tuesday, 23rd, one buffalo was found dead and five more sick, and the remaining thirty-five apparently healthy contacts were inoculated with anti-hæmorrhagic septicæmia serum, using an average dose of 40 c.c. On the morning of Wednesday the 24th, four buffaloes (of the five sick the previous day) were found dead. On Thursday the 25th, one inoculated buffalo showed typical clinical signs of the disease and died the same day. On the morning of Friday the 26th, another inoculated buffalo was found exhibiting advanced characteristic clinical symptoms, and it died the same afternoon.

(c) On this day, I inoculated a guinea-pig with 3 c.c. jugular blood from an uninoculated animal which had been slightly sick since the 23rd, and was still living. The guinea-pig died in convulsions three and a half hours later, and the bacillus was found in its heart blood. The sick buffalo definitely recovered on the 28th, and showed no ill after effects. From Saturday the 27th onwards, there were no more cases of the disease, the outbreak being then successfully controlled. In addition to practising serum inoculation, we advised the owners to keep the buffaloes near their stables and not to use the previous grazing grounds, but I am doubtful if this advice was acted on. Export of animals from the kampong was prohibited.

v. Gunong Pari (second outbreak).

On Sunday, 28th October, we were advised that an Indian milch buffalo had been found dead in a stable at Gunong Pari, about quarter of a mile distance from the scene of the first outbreak, and also that an Indian buffalo had been found dead at Kampong Keling, which latter kampong is situated some two miles nearer Ipoh than Gunong Pari.

(b) At Gunong Pari, necrotomy revealed the usual features of hæmorrhagic septicæmia, and, in addition, there was found a gelatinous infiltration of the musculature overlying the trachea. This was the first case in which I myself had seen intermaxillary œdema. The total number of buffaloes, exclusive of the dead one, in the immediate vicinity was one hundred and twelve, one hundred and one being Indian milch animals (including some calves), and the remaining eleven, Malay draught buffaloes. On Monday the 29th October these one hundred and twelve contact animals were inoculated with antiserum, using an average dose of 50 c.c. There were as additional contacts, two Indian bullocks, two Siamese bullocks, and one cow and calf, but these were not inoculated.

(c) On Tuesday the 30th, one inoculated yearling buffalo, said to be a chronic earth eater, was found dead, and *post-mortem* examination revealed typical hæmorrhagic septicæmia with copious gelatinous exudate extending from the intermaxillary region to the sternum. From Wednesday, 31st onwards, there were no more deaths from the disease. All owners were advised not to use the previous grazing grounds, but I have reason to believe that this advice was not acted on. The Malay buffaloes, which worked in the woods, were reinoculated with 60 c.c. serum on the 14th November, since it was considered that, as they were working in the neighbourhood of the original grazing grounds, they were being exposed to extra risk. I may mention that, previous to the appearance of the disease in the Gunong Pari area, animals from the two separate kampongs were said not to have used the same grazing grounds, and this I believe was subtantially correct, but after the commencement of the first outbreak of the enzootic there, I myself saw odd animals from both sets of premises, grazing together in a small area between the respective kampongs, and this in spite of warning of the danger of infection by so doing. It would therefore appear, to my mind, to be a legitimate assumption that the two animals which died at the second kampong, contracted infection indirectly from sick animals in the first kampong, by grazing over ground used by these latter animals while in the early stages of illness. About a fortnight after inoculating the animals in the second kampong, I found these animals one day, grazing quite close to the pastures where it was presumed the animals in the first infected kampong had picked up the infection, so that I imagine little or no real notice was ever taken of the advice, firstly to avoid the original grazing grounds, and secondly to avoid allowing their animals to go near pastures used by buffaloes from the other kampong.

vi. Kampong Keling.

On Sunday, 28th October, word was received from Kampong Keling, about two miles south of Gunong Pari on the Ipoh Road, that an Indian milch buffalo had been found suddenly dead. *Post-mortem* examination disclosed typical hæmorrhagic septicæmia with intermaxillary and sternal œdema. The affected kampong was situate near the banks of a stream separate and distinct from that at Gunong Pari, so that there was no apparent relation between the disease at Gunong Pari and this new outbreak. In the kampong, there were eighteen Indian milch buffaloes (including calves) and some eighty head of cattle, some of these latter being milch animals and some draught animals. On Monday the 29th, the remaining seventeen contact buffaloes were inoculated with anti-serum, 50 c.c. being the dose used ; the cattle were not inoculated.

(b) The owners were advised to use new grazing grounds, and no more cases occurred.

Conclusion.

An interesting feature of last year's outbreaks, as a whole, is the fact that of forty dead animals only three showed evidence of intermaxillary or sternal œdema, and of forty-one affected animals only one recovered, recovery being complete in five days' time ; no ill after-effects were noted. The average duration of perceptible illness, so far as one could gather, was about twelve hours, and the longest duration of fatal illness noted, was three days.

The fact that the *Bacillus bubalisepticus* might be termed a near relation of the death-dealing human *Bacillus pestis*, raises the question of danger to the public health through the consumption of milk from affected kampongs. Although our present evidence of potential danger is negative, we can hardly claim to be entirely justified in liberating such milk for public consumption and, personally, I am of opinion that it is sound policy to stop the milk supply until such time as the herd has been protected by anti-serum.

In the 1925 outbreak, when serum was not used but appropriate quarantine measures instituted, twenty-one buffaloes died out of twenty-two at Gunong Terendam, fourteen out of fifty-one at Kampong Sungei Dalam, and twelve out of thirty-five at Ulu Piah.

In the 1927 outbreak on the Gopeng Road eleven uninoculated buffaloes died out of fifteen.

At Kampong Chenderong in 1928, twenty-three cases—all fatal—occurred out of a total of thirty-three uninoculated buffaloes, in spite of attempts to keep the animals from what were considered to be the previous regular grazing grounds.

In the inoculated groups at Gunong Pari and Kampong Keling, the disease incidence was, after inoculation, two cases out of thirty-five buffaloes in the first kampong at Gunong Pari, one case out of one hundred and twelve buffaloes in the second kampong, and at Kampong Keling, where there were seventeen inoculated buffaloes, no case occurred. It will therefore be gleaned from the foregoing necrology that serum prophylaxis would appear to be the method *par excellence* for the control of the disease.

An encouraging feature, from a professional point of view, in connection with the Gunong Pari and Kampong Keling outbreaks, was the request of nearby and even relatively distant buffalo owners to have their animals inoculated against the disease ; these owners also expressed their willingness to pay for this service. It had to be explained, however—apart from the fact that we had not

sufficient serum available to gain a little cheap *kudos*—that serum prophylaxis was unsuitable for animals which were never likely to be actual contacts, as the disease had no tendency to spread, and the passive immunity conferred by serum lasted for fourteen days only. Vaccine therapy, on the other hand, although not necessary, might possibly have been justifiable in the eyes of the possessor of an elastic conscience, but as we had no vaccine available, the owners were simply advised absolutely to avoid going near the affected kampongs and to keep their buffaloes to their customary pastures. They were assured that if they followed these instructions there was little fear of their animals contracting the disease, and this fortunately proved to be true.

In connection with serum therapy in infectious disease in general, I think that, although we have no statutory power to compel owners to allow protective inoculation of their animals, we should never lose sight of the Roman adage, "*Salus populi suprema est lex*" and, acting on this, we should always stretch our legal conscience to the utmost more or less to compel owners to allow protective inoculation with serum during outbreaks of disease. The various ways and means by which this can be done require no enumeration and, above all, we should avoid taking up that attitude of "*laisser faire*" into which we may be tempted to fall because of the owner's apathy and obstinacy; we should constantly bear in mind that a loss to the individual is a loss to the State, to the country of which the State is a part, and therefore to the Empire as a whole.

References.

1. Hutyra and Marek: "Special Pathology and Therapeutics of the Diseases of Domestic Animals." Baillière, Tindall & Cox. Third Edition, Vol. I, page 99 *et seq.*
2. Scott: "Indexed System of Veterinary Treatment." Baillière, Tindall & Cox. 1922, page 217.

Discussion.

Mr. R. A. B. Stanhope (Hon. Secretary), in opening the discussion, said: Mr. Wallace apologises for his choice of subject. I do not think it is at all necessary for him to do so, for, in my view, at the present time, and especially following his recent experience of the disease in Perak, his choice is very appropriate and to the point, and very commendable. He has given us a very clear and concise picture and description of this disease in its acute enzootic form, and we have, I am sure, to thank him for this.

Mr. Wallace says that only comparatively recently has this form of the disease been demonstrated as of importance in Malaya, though sporadic cases of the sub-acute form had been reported previously. My own small experience of the disease has been with some of these cases or, as I would prefer to call them, small sporadic outbreaks, as several beasts—up to a half a dozen or a dozen or so—have been affected each time. These outbreaks have been very localised, only two or three places in the Negri Sembilan being subject to them from time to time, usually with a few years' interval between their recurrences. The disease, as I have seen it, is certainly much less acute than the form which Mr. Wallace describes; the œdematous swellings under the jaws, throat and sternum are more marked, and there is some looseness of the bowels, but without any sign of blood in the fæces. On *post-mortem*, the pneumonia is much more developed, even gangrene of the lungs being present in many cases.

One very interesting point mentioned in the paper is the question why this organism—a saprophyte—suddenly assumes such pathogenic virulence as to cause an acute disease. It seems to be some peculiar characteristic, which is so far quite unknown, of the organism itself, something quite apart from any of the other influences (weakness, starvation, etc.) that ordinarily reduce an animal's usual resistance to disease.

It is very pleasing to hear of the success Mr. Wallace has had with his prophylactic inoculation serum in the control of the disease. Such demonstrable successes will, as Mr. Wallace points out has already been done on at least one occasion during one of the outbreaks, gain for our service increased and desirable prestige and confidence amongst the native population, especially the Malays, and will encourage them to co-operate with us in our efforts on their behalf, instead of trying to oppose us, as they frequently do. Mr. Wallace suggests converting the passive immunity of serum inoculation into an active immunity by the use of vaccine also, but, all things considered, especially the practical difficulty that he himself points out, I think it better for our conditions to keep to the serum inoculation alone, even though it does mean repeating the operation fortnightly for a while.

On the question of differential diagnosis, Mr. Wallace mentions rinderpest. For some little while before receiving a copy of this paper, I had been giving some thought to the possibility of mistaking the two diseases, especially in view of the statement of Hutyra and Marek (Vol. 1, page 143, of the latest edition) that in countries where rinderpest is prevalent, as in Eastern Asia, hæmorrhagic septicæmia has been mistaken for that disease, and my first impressions, on my first and rather hurried glance through the commencing pages of the paper, were of the similarity between the two diseases; but, on reading more deeply, especially the later part of the paper, and recollecting the outbreaks of rinderpest I had seen, I realised that the similarity between the diseases is superficial and that there should be little confusion between them, especially when resort is had to microscopical examination and animal inoculation to support the clinical and *post-mortem* evidence.

Mr. R. Macgregor: Mr. Wallace has covered his subject so thoroughly and made his points with such certainty that I have been able to find little upon which to comment. I trust that he will therefore excuse a short contribution from me.

On one point, however, I would join issue with him. The disease has, I think, been known for a considerable time in Malaya; at any rate, I remember Mr. Symonds mentioning it when I took over from him in 1924.

I would suggest that Sampah Kerbau be added to the list of synonyms. It is a fairly common term in Pahang, and its general use might assist in differentiating between rinderpest and hæmorrhagic septicæmia.

On the point of staining, I have recently been doing a little with the pasteurella of poultry, a similar organism, but have sometimes found that, if the stain is left long on the slide, there is a tendency for the centre of the organism to stain, giving the appearance of a rod-shaped organism, slightly darker, perhaps, at the ends. This is probably overstaining. What of methylene blue? Is this not recommendable for this organism?

You will all recollect that I recently called your attention to the fact that during some outbreaks of rinderpest in Pahang, the disease did not spread from buffaloes to oxen. This was explained by one of you as being due to an error in diagnosis, *i.e.*, that the disease was not rinderpest but hæmorrhagic septicæmia. It is of course impossible now to provide any definite proof either way, but after reading this extremely lucid account of the symptoms, course, and *post-mortem* signs of the disease, I adhere to my original opinion. Rinderpest, as experienced in Pahang, spreads from village to village, and is definitely not localised. It is certainly virulent to wild pigs. It occurs with equally disastrous results in dry or wet weather. Many animals survive more than two days, and lesions in the mouth and alimentary canal are always found in these

cases. Lung lesions are so rare as to be negligible. This does not, of course, remove the possibility of a combined infection, and I am quite ready to believe that such does occur, and has on occasions occurred. What is more likely than that the organism should attain a virulence in a body whose resistance has already been reduced by another disease ?

In Pahang, sporadic deaths of numbers of buffaloes occur from time to time. I recollect that during June, 1927, a report was sent to me from Temerloh that six animals had died in the course of forty-eight hours. The country was still rather disorganised from the heavy floods of the previous January, and the report did not reach me until four days after the last death, and it took three days for me to get to the village. There were no animals left ; according to the villagers there had been only six, and these had all died, but I feared that there had been more and that the survivors had been taken away and hidden, for there seemed more sawah land than six animals could work. I therefore stood by for another outbreak of rinderpest, but nothing happened. Possibly this may have been hæmorrhagic septicæmia, checked by movement of the animals to higher ground.

Lastly, will Mr. Wallace please tell me from where he got the serum, and the price for it ?

Mr. K. D. TURNER : Mr. Wallace has dealt with the subject very thoroughly and the replies have brought out all I wished to ask. I shall not hinder further discussion, therefore, and will content myself with thanking Mr. Wallace for the paper.

Mr. G. P. PURVIS congratulated the essayist on " a good piece of work," and proceeded : Taking the paper in general, I have one criticism to make and that is, that while Mr. Wallace had cases of the pectoral, œdematous and enteric forms of the disease, his descriptions of the pathological anatomy, symptomatology, course and prognosis, diagnosis and differential diagnosis of the condition refer almost entirely to the pectoral form. A false impression of the disease is conveyed by this somewhat one-sided treatment. The essayist is also too apt to draw general conclusions from the particular case or small outbreak throughout the paper.

The disease was fully recorded in Malaya in 1902 (by Dr. Carougeau), but I shall not go into this here. I will say, however, that hæmorrhagic septicæmia is the commonest disease of bovines in Asia, rinderpest alone excepted. The general statement that in " Malaya the thoracic type would appear to be the rule " is the general conclusion from a particular outbreak and cannot be accepted therefore as generally correct.

In Asia the disease is usually recorded at the beginning of the rainy season. As it is seldom very long dry here, we can expect outbreaks at any time.

In the latest standard work I have seen on Bacteriology, Bugey's " Manual of Determinative Bacteriology," 2nd edition, 1926, pages 260-263, Pasteurella (Trivissan 1857) is used as the generic name. As this is a particular variety of bacillus the name seems too useful to drop. *P. boviseptica* is the specific name used, as bubaliseptica, according to many authorities, is not a good species (Buchanan, "Veterinary Bacteriology," 2nd Edition, 1916, pages 290-291), though others, again, say that it is. I do not know of any recognised authority who states, as in Mr. Wallace's paper, that it can occur in diplococcal form. All authorities I have read state definitely that it is a polymorphic ovoid bacillus (Jacotot. *Archiv. d' Institute Pasteur d' Indochine* 1927, Nos. 5 and 6, April-October, pages 23-24). The species cuniculicida is a different one from boviseptica.

It is generally agreed that the buffalo is far more susceptible than the ox. (Jacotot, page 86.) This is one of the main points in differential diagnosis. Hutyra and Marek, 1913, give the course as from six hours to eight days. Jacotot, pages 16-18, gives in the acute form six hours to five days, and in the chronic form up to some months.

The author gives *post-mortem* changes in the pectoral form, œdematous form or the mixed, but avoids all reference to the *post-mortem* of his intestinal cases. I note that it is not claimed that the bacillus can always be found microscopically in the blood. I consider that *post-mortem* examinations should be avoided in order not to contaminate the ground.

Mr. Wallace says : " Diarrhœa is not found in acute hæmorrhagic septicæmia of the buffalo, nor is there acute injection of the conjunctiva during life." In the first generalisation from particular cases Mr. Wallace disagrees with all the authorities, including Hutyra and Marek. In peracute cases diarrhœa may well not have had time to appear, but he has not said that (Jacotot, page 15). *Re* the second point, Hutyra and Marek say : " in the eyes an acute conjunctivitis develops," and Jacotot (page 13) : " and particularly the conjunctiva—brick red."

Mr. Wallace does not believe in easy extension of the disease, but this is another unjustifiable generalisation. As all excretions and tissues of an affected animal are infective late in the course (page 105, Hutyra and Marek, 1913—Cattle Disease) it will spread or be carried almost as rinderpest will, though that spreads far more rapidly owing to the infectivity of the apparently healthy animal in the incubative stage.

In anti-rinderpest work it is reckoned that a correct serum dose will practically all be excreted in ten days. As Mr. Wallace has used a large dose, fourteen days might do, but I should like to suggest use of the prescribed dose every ten days. Serum is too expensive to waste, although we all like to make sure of our results. Personally, I think the use of vaccine to be the sounder method, particularly as Mr. Wallace has not found the serum to be of any apparent curative value. Other workers have.

The non-tendency to spread makes " rigorous quarantine unwarrantable." I have already criticised this point, but would draw your attention to the actual spread recorded in this paper owing to lack of rigorous quarantine.

Concernlng the outbreaks in Perak South, what was the common form of the disease in the 1925 and 1927 outbreaks ? I have already noted that hæmorrhagic septicæmia was recorded in Malaya in 1902. It is worthy of note that only gastro-enteritis was present and that no bacilli could be found microscopically in the blood of the first two cases (Division IV. b.). In the next four and also in the subsequent cases what were the *post-mortem* findings ?

Divisions III, V and VI. No analysis is made again of the form in which the disease occurred. What was the percentage of pure enteritic cases ? We are only told that of forty deaths in 1928, three showed œdema.

In reference to the author's " Conclusion " section, I strongly advocate the use of vaccine instead of serum. It is sounder to produce an active immunity than a very temporary one. This can be seen when it is noted that a second outbreak occurred at Gunong Pari.

Mr. W. PEREYRA : On the question of the differentiation of rinderpest from hæmorrhagic septicæmia, the mouth lesions are distinctive in rinderpest. These start as small pin-point vesicles, get larger, and coalesce until they may become quite big. When we have found these lesions we diagnose rinderpest, and if they are found in the gall bladder also, we can be certain. In India in the field laboratories we had to cut out the tongue and lower jaw and present them in support of our diagnosis.

Mr. KHANNABIRHIAN : In rinderpest, too, one finds the " zebra markings " in the ileum, and in rinderpest, also, the light red conjunctivitis of the eye and accumulation of mucus is characteristic.

Mr. KIRLY : In 1919 there were some sudden deaths of buffaloes at Bachang, a few miles out of Malacca town. Fifteen animals were affected and all died in one or two days. They showed some swelling of the throat, suffered a good deal, and had some difficulty in breathing. We had no facilities for microscopic examination, but diagnosed the disease as hæmorrhagic septicæmia from the symptoms. The area was quarantined and buffaloes were kept off the low-lying places, and the disease stopped.

A general discussion now ensued, several points raised being debated. On the point of previous reports of the disease, the CHAIRMAN pointed out that, though there were previous reports of the disease on several occasions, they were generally reports of the " subacute " type or

"sporadic outbreaks" and only recently had the "acute enzootic" form of the disease been mentioned. The differentiation of the disease from rinderpest was also discussed.

THE REPLY.

Mr. WALLACE (in reply) said: I am rather sorry that, generally speaking, you appear to find little controversial matter in the paper, as controversy often forms the basis of a useful discussion; in particular, I was hoping that some discussion might have centred on the mode of infection. Since writing the paper, I have had an opportunity in Kedah of inspecting the weekly reports of the last two years from Southern Siam, and I find, in connection with seasonal incidence, that the months of August and September would appear to be the period of occurrence in that country. In Singorra district from 1st to 14th August, 1927, ten cattle and forty buffaloes died of hæmorrhagic septicæmia; from August 15th to August 31st, 1927, ten buffaloes died of the same disease. From September 16th to September 30th, 1927, in the Singorra district seventy-five cases of hæmorrhagic septicæmia were reported in cattle and buffaloes with fifty deaths, twenty animals remaining under treatment on September 30th. I could find no further report concerning the twenty under treatment and presume they died.

Mr. Stanhope, like myself, is puzzled with the problem of why a saprophyte should suddenly become pathogenic or why animals should suddenly become susceptible to infection by known saprophytes, and there appears, to my mind, to be no satisfactory explanation. That curious factor, usually referred to as the third factor, in disease causation, does not seem to be at all understood, and the usual factors cited—exposure to chills, fatigue, overwork, bad food, lack of food, etc., will not, of course, hold water, as it appears, indeed, that the incrimination of these factors simply serves as a cloak for our ignorance.

Mr. Macgregor is of opinion that the bacillus of hæmorrhagic septicæmia has shown its destructive ability in Malaya for several years, but in the weekly reports of the past twenty years there is no record of enzootic outbreaks of hæmorrhagic septicæmia. Certain, of course, it is, that sporadic cases of the disease have occurred, and it is quite possible that there have been subacute outbreaks which might be classed midway between the sporadic and the acute enzootic type, although they do not appear to have been specially recorded. I have never heard of the term "Sampah Kerbau" and cannot explain its origin. "Sampah," I believe, means "rubbish" or "filth." I am afraid I am unable to explain why the fowl cholera bacilli, stained according to Leishman's method by Mr. Macgregor, failed to exhibit bipolar characteristics; the only explanation I might suggest is over staining, or defective staining material.

Methylene blue is excellent for showing bipolar staining, especially when the smear is subjected to subsequent rapid treatment with dilute acetic acid, but of course there is no colour differentiation of the various elements in the smear.

The anti-serum is obtained from the Muktesar Institute, India, in bottles of 300 c.c., but I am unable at the moment to quote the price of the product. I may mention, in connection with my serum experience, that all the inoculations referred to in the paper were done by myself as I was anxious to have reliable first-hand evidence of the value or otherwise of the serum.

Mr. Purvis, in the course of his remarks, appears to have overlooked the fact that the paper is on hæmorrhagic septicæmia *with special reference to recent outbreaks in Perak South*, and I do not by any means attempt to generalise by suggesting that what is found in this country must of necessity be the rule in other countries of which I have, of course, no experience, nor do I make any pretence to deal with or contest the clinical manifestations of the disease in these other countries. Certainly, the cases encountered in Perak South were from my experience and that of Mr. Short, all of the pectoral type, and there is to my knowledge no *post-mortem* record of any other type in Malaya. Criticism on this point, although it may be interesting from a comparative standpoint, is therefore somewhat *ultra vires*.

Authorities on which Mr. Purvis places great reliance, are, of course, to be treated with respect, but one cannot get away from actual clinical experience and *post-mortem* examinations, in spite of the findings of these authorities in outbreaks of the disease in other countries.

The statement that the bacillus of hæmorrhagic septicæmia may occur as a coccus or diplococcus is on the authority of Hutyra and Marek, and the term *Bacillus cuniculicidus* is, of course, derived from cuniculus—a rabbit, and was no doubt originally used with special reference to rabbit septicæmia. In the outbreaks referred to in the paper no case of the intestinal type of the disease was encountered, and in only two cases, the two exhibiting acute gastro-enteritis only, were pulmonary lesions absent on *post-mortem* examination. I may mention that in my opinion *post-mortem* examinations are very advisable for diagnostic purposes. In spite of the statement of authorities that acute conjunctivitis is seen in hæmorrhagic septicæmia, I have never seen a case exhibiting this condition and, as I have already said, one cannot get beyond one's own clinical observations.

So far as Malaya is concerned, the disease has never been found to spread any appreciable distance, but appears to remain localised in the affected kampong and its immediate environs. The Gunong Pari case referred to by Mr. Purvis as an example of spread by contact would certainly appear to be so, but there is of course no proof that this contact was the actual cause of the disease, as one has no definite knowledge that the animal in question did not pick up infection somewhere else, *e.g.*, in the place habitually used for grazing by the first infected herd.

In the 1925 and 1927 outbreaks dealt with by Mr. Short, all cases were of the pectoral type, and twenty-nine *post-mortem* examinations were made. In the Gunong Pari outbreak described by me, the original two cases showed intense gastro-enteritis only, with no diarrhœa; the next four cases all showed the typical pectoral lesions as described in the paper. There were no enteric cases in any of the outbreaks, the pectoral type being found in every case examined *post-mortem*. Concerning Mr. Purvis' view that vaccine therapy is the ideal procedure, I must point out, firstly, that vaccine is expensive and does not keep for more than three months, and secondly that, the disease being a localised one, there is no need for treatment, either by vaccine or serum, of any animals not in the immediate vicinity of the outbreak. Serum prophylaxis is the ideal during an outbreak, as there is obviously no time for vaccine immunity to be established.

Mr. Pereyra has given us an excellent description of the mouth lesions found by him in rinderpest outbreaks, which mouth lesions are, of course, of great value in differential diagnosis, as they are never found in hæmorrhagic septicæmia.

Mr. Khannabirhain has pertinently called attention to "zebra markings" in the ileum as being useful in differentiating rinderpest from hæmorrhagic septicæmia.

I was interested to learn from Mr. Kirly that submaxilliary œdema had been found in cases at Batchang, but I think these cases could hardly be described as occurring during an acute enzootic outbreak of the disease. The outbreak there seems to have been in character midway between the subacute sporadic and the acute enzootic type.

The suggestion that low-lying places should be avoided is no doubt an excellent one, and is also made by authorities in other countries, but is this a practical proposition when we realise that the natural home of the Malay buffalo is in the swamps where he loves to wallow?

Following Mr. Wallace's reply and his statement that his paper was not by any means a comprehensive survey of the disease, Mr. MACGREGOR said that he must therefore modify his statement as to his being satisfied that the disease in Pahang was rinderpest.

A serious outbreak of erysipelas among pigs is causing great concern to farmers in the Eastern Counties. The epidemic is widespread, and in the Isle of Ely in particular, losses have been heavy.

BURNS AND THE CONGRESS.

(*Contributed.*)

In view of this year's Congress meeting in the Land o' Burns, it is interesting to find many lines, in the poet's works, which might be applied to the various Congress activities:—

"Again the silent wheels of time,
Their annual round have driven;"

and we are meeting under the presidency of Dr. Bradley—

"Great is thy power, and great thy fame,
Far kenn'd and noted is thy name"—

in

"Auld Ayr, wham ne'er a town surpasses
For honest men and bonny lasses,
Among the bonny winding banks,
Where Doon rins wimplin clear,
Where Bruce ance rul'd the martial rank,
And shook the Carrick spear."

From the first meeting may we be able to say:

"Happy we are a' thegither,
Happy we'll be yin and a',
Time shall see us a' the blyther,
Ere we rise to gang awa."

To those who have contributed papers for discussion, words from one of his letters might be addressed:

"Kind sir, I've read your paper through,
And, faith, to me 'twas really new,
. . . . . .
A' this and mair I never heard of,
And but for you I might despaired of."

While after papers have been read it might be asked:

"Is there a man whose judgment clear,
Can others teach the course to steer?"

Few are the references to animal diseases in his poems, and we find no description of any comparable to his remarks on toothache:

"When fevers burn, or ague freezes,
Rheumatics gnaw, or cholic squeezes,
Our neighbour's sympathy may ease us,
Wi' pitying moan;
But thee—thou hell o' a' diseases,—
Aye mocks our groan!"

Burns, however, knew something of spavin when he wrote:

"My spaviet Pegasus will limp,
Till ance he's fairly het."

Four lines from the "Cotter's Saturday Night" might fitly be applied to that recently introduced feature of the Congress programme—the Church Parade:

"From scenes like these old Scotia's grandeur springs,
That makes her lov'd at home, rever'd abroad,
Princes and Lords are but the breath of Kings,
'An honest man's the noblest work of God'!"

Lines applicable to the social side of the Congress are to be found in abundance, but these must suffice:

"Love blinks, Wit slaps, and social Mirth,
Forget there's Care upo' the earth;
The sweetest hours that ere I spent,
Were spent amang the lasses, O."

So till the end of Congress week, when—

"—— each took aff his several way,
Resolved to meet some ither day."

"To sum up all, be merry, I advise;
And as we're merry, may we still be wise."

Glasgow College Governors are appealing to farmers for £10,000 towards the cost of Auchincruive and Glasgow College reconstruction schemes.

Intravenous injection of calcium eosinate will protect against anaphylactic shock by causing a colloidal change in blood plasma.—*Bio. Abst.*

Live Stock Improvement Scheme.*

ABSTRACT FROM REPORT FOR THE YEAR ENDING MARCH 31st, 1929.

The Live Stock Improvement Scheme has been in operation since 1914 and its object, scope and procedure are now fairly well known and appreciated by the farming community. Under the Scheme financial assistance is given by the Ministry to Societies, and in connection with pig breeding to individuals, to encourage (1) the provision of approved pure bred sires for service at low fees, for the benefit of small farmers and small holders, and (2) the recording of the milk yields of cows, with the object of improving the quality of the ordinary farm live stock of the country. Grants are made to assist in the provision of pedigree bulls, boars and heavy stallions in all parts of England and Wales, and similar grants are made in Wales also in respect of a limited number of Welsh Mountain rams. Since the scheme came into operation progress has been recorded in each section practically every year—indicating that the scheme was originated on sound lines, and that its results have been beneficial to those farmers who have been prepared to take advantage of it. During the year ended March 31st, 1929, there were further increases in the number of premium bulls, boars and heavy stallions, but the membership of milk recording societies showed a decrease for the first time since official milk recording was commenced.

Bulls. The number of bulls available for service under the scheme during the year ended March 31st, 1929, was 1,408, or thirty-six more than in the preceding year, and the average number of services per bull was sixty-three.

BULL SCHEME.

Number of bulls subsidised since the commencement of the scheme: 1914-15 (including the period Feb. 1st, 1914, to March 31st, 1914) (April 1st-March 31st), 497; 1919-20, 675; 1924-25, 1,069; 1927-28, 1,372; 1928-29, 1,408.

In considering the above figures it should be remembered that the beneficial results of the scheme are not confined to the 70,000 or 80,000 calves born each year which have been sired by the premium bulls. The effect on the quality of the cattle of a district where premium bulls have been located for some time is cumulative, successive generations showing further improvement. A good number of farmers are grading up their non-pedigree stock for the Herd Books by using the premium bulls.

Now that the benefits of the scheme are becoming more generally known, Live Stock Officers have less difficulty in securing the interest of farmers, and in forming Bull Societies in those areas where at first little headway could be made.

Breeds and Prices. The following shows the number and prices of the premium bulls according to breeds, 1928-29: Aberdeen-Angus, 9, £48 5s. 1d.; British Friesian, 1, £47, 5s. 0d.; Devon, 152, £52, 9s. 4d.; Galloway, 1, £27 6s. 0d.; Guernsey, 18, £39 15s. 5d.; Hereford, 156, £47 12s. 5d.; Lincoln Red, 180, £47 17s. 1d.; Red Poll, 1, £42 0s. 0d.; Shorthorn, 764, £49 8s. 1d.; South Devon, 10, £43 0s. 10d.; Sussex, 5, £39 11s. 10d.; Welsh Black, 71, £32 9s. 11d.; All breeds, £48 4s. 5d.

Service Fees. The service fees charged for the use of premium bulls ranged from 2s. 6d. to 10s. 6d. In most parts of England more than half the fees charged are at the rate of 5s. 0d. or less per service, the only counties where more than half the fees are above 5s. 0d. being Cumberland, Northumberland, Durham, Lincoln, Rutland, Isle of Ely and Somerset.

Boars. In the year ended March 31st, 1929, there was a further increase in the number of boars available for service under the scheme. The following shows the number of boars in respect of which grants have been paid each year.

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*Abstracted from the *Journal of the Ministry of Agriculture*, Vol. xxxvi, No. 5.

BOAR SCHEME.

Number of Boars subsidised since the commencement of the scheme: April 1st to March 31st—1914-15, 115; 1919-20, 399; 1924-25, 655; 1928-29, 933.

Pig prices remained low during 1928 and, as always occurs in such circumstances, the number of breeding sows in the country was reduced. The average number of sows served per boar was fifty-four.

During the year, further reports have been received as to the improvement in the general quality of the pigs in districts where premium boars have been located.

Breeds and Prices. Pedigree boars were purchased at slightly easier rates last year, and the average price of all the premium boars located on March 31st, 1929, was £12 17s. 3d.

As in the previous year, a fair number of applications were received from owners of premium boars to provide Large White boars in place of those of other breeds, as owners of sows in their districts were asking for the change. Consequently, the number of Large White boars provided under the scheme increased by 57, and this breed accounted for 64 per cent. of the total against 61 per cent. in the previous year and 47 per cent. three years ago.

Service Fees. The service fees again ranged from 2s. 6d. and 10s. 0d. Although there are a few more boars for which a service fee of 10s. 0d. is charged, the general tendency is downward.

Horse Breeding.—*Heavy Horses.* The number of heavy stallions hired by societies receiving grants from the Ministry was further increased in 1928, and the number of mares served by stallions travelled under the scheme was 10,073 against 7,610 three years previously. It has to be remembered however, that although additional Heavy Horse Societies have been formed in certain areas during the last few years, and more mares have been served by subsidised stallions, there is as yet no evidence that the decline which has been continuous since1919 in the breeding of heavy horses in the country has been arrested. Last year it was thought that the small reduction of only 100 in the total number of heavy foals in England and Wales in 1927 might indicate that breeding had then reached its lowest point, but in 1928 there was a further reduction of 1,380. The total number of heavy foals in 1928 was only about 22,700, a number which would appear to be inadequate to meet the requirements of farmers and other users of draught horses when these foals arrive at working age, since even now the reduced supply of heavy horses is being felt on the market, although five years ago there were 50 per cent. more heavy foals than last year. The decline in breeding has naturally led to a decrease in the number of stallions in the country, and in 1928 only 1,033 heavy stallions were licensed in England and Wales against over 2,000 five years earlier.

Representations have been made to the Ministry that the present grants for heavy horse breeding are inadequate, and in view of these representations and the decline in breeding, it has been decided that further encouragement should be given to farmers to breed heavy horses. The direct grants payable to Heavy Horse Societies will therefore be increased next season from £40 to £60 per stallion, and grants will be payable in respect of stallions hired at a fee not exceeding 400 guineas and serving at a fee not exceeding four guineas, as compared with the present maxima of 300 guineas and three guineas respectively. It is hoped that the increase in the grants will have the desired effect.

HEAVY HORSE SCHEME SINCE 1924 (when subsidies were stopped).

Service Season	No. of Stallions	Total No. of Mares served	Average No. of Mares served	No. of Assisted Nominations	Average Hiring Fee of Stallions	Average Service Fee £	s.	d.
					£			
1924 ...	87	6,098	70	*	178	2	7	0
1925 ...	96	7,413	77	1,723	194	2	8	4
1926 ...	98	8,165	83	2,171	208	2	8	6
1927 ...	105	8,950	85	2,599	211	2	8	9
1928 ...	114	9,792	86	2,805	217	2	9	4

*No grant was made by the Ministry for assisted nominations (except to the Cumberland Society) for the Service Season 1924.

Horse Breeding Act, 1918. The number of stallions licensed under the Horse Breeding Act, 1918, in the licensing year ended October 31st, 1928, was 1,414, a decrease of 123 as compared with the previous year. It will be seen below that the decline in the number of stallions licensed has been continuous since 1921.

Number of licences issued years ending October 31st—1920, 3,749; 1921, 3,816; 1922, 3,479; 1923, 2,761; 1924, 2,210; 1925, 1,849; 1926, 1,608; 1927, 1,537; 1928, 1,414.

The number of stallions of each breed or type licensed for the 1928 service season, and the number to which licences were refused, are shown below:—

NUMBER OF STALLIONS LICENSED.

Heavy—Shire, 720; Clydesdale, 120; Suffolk, 132; Percheron, 38; Others, 23; Total—Heavy, 1,033.

Light—Thoroughbred, 164; Hackney, 63; Arab, 12; Hunter, 5; Cleveland Bay, 5; Yorkshire Coach, 2; Welsh Roadster, 1; Others, 4; Ponies (including Welsh Cobs), 125; Total—Light, 381; Grand Total, 1,414.

The Thoroughbred was the only breed to show an increase in 1928 in the number of stallions licensed, *viz.*, 164 against 153 in the previous year, but even so, light stallions as a whole showed a relatively sharper decrease than heavy stallions. The reduction in Hackneys was as much as 35 per cent., from 97 to 63, while ponies (including Welsh Cobs) declined from 154 to 125. There was practically no change in the number of Clydesdales licensed,120 in 1928 against 121 in 1927, but Shires declined by 52 to 720, and Suffolks, which numbered 132, showed a decrease of seven.

Rams. As in each year since 1919, grants were made in 1928 to a number of societies in Wales with the object of improving Welsh Mountain sheep. Twenty-five rams were provided under the scheme, and the number of ewes served was 1,504, or 60 per ram. The hiring fees of the rams ranged from six guineas to twelve guineas, and the service fees from 1s. 0d. to 3s. 6d.

Milk Recording.

The number of members of Milk Recording Societies showed a decrease in 1927-28, this being the first appreciable decrease in membership since official milk recording was commenced in 1914-15. There were 5,174 members in 1925-26, and this figure was practically maintained in the following year, but in 1927-28 the number fell to 4,862.

Milk Recording Societies are not alone among the societies connected with agriculture which have seen a reduction in their membership in the last year or two as a result of the general depression in the industry. As, however, the majority of the herd owners who have resigned are reported to record their cows privately, the decreases in the membership of milk recording societies need not occasion any anxiety as to the soundness of the object of the Ministry's milk recording scheme, which is primarily educational.

It may be useful to state briefly that the benefits to be derived from milk recording are that unprofitable cows are discovered and can be drafted out of the herd; feeding can be carried out more economically; ailing cows are quickly detected; the best cows and bulls from which to breed can be determined; and increased interest on the part of the farmer and stockmen is obtained.

Average Yield of Recorded Herds. The number of cows recorded under the Ministry's Scheme in 1927-28 was 149,971, of which 77,171 were cows which had been in the recorded herds for the whole of the year. The percentage of full-year cows to total cows recorded has remained fairly steady from year to year since 1921-22, at slightly over 50 per cent.

The average yield of full-year cows in 1927-28 was 6,954 lb. (673 gallons), which showed a small decrease on the previous year. A reduction in the average yield was to be expected owing to the very poor quality of the hay crop of 1927 following the wet summer of that year, and the shortage of grass in the spring of 1928. Decreased average yields were shown by thirty-seven of the fifty societies,

and only three societies, against six in the previous year, had average yields exceeding 7,500 lb. (726 gallons) per cow. Suffolk with an average of 7,603 lb. (736 gallons) headed the list, being followed by Durham and Essex with averages of 7,572 lb. (733 gallons) and 7,565 lb. (732 gallons) per cow respectively.

Individual herds with average yields for full-year cows of 8,000 lb. or over numbered 944, or 20 per cent. of the herds recorded for the full year, whilst another 1,206 herds, or over 25 per cent., averaged from 7,000 lb. to 8,000 lb. per head for full-year cows.

As regards the number of cows of the different breeds recorded, Shorthorns accounted for 63 per cent., Friesians coming second with 15 per cent., followed by Guernseys with nearly 5 per cent. and Red Polls and Jerseys with over 3 per cent. The total number and yield recorded are as follows :—

Average Yield : Ayrshire, 2,405, 7,106 lb. ; Blue Albion, 1,494, 7,242 lb. ; Devon, 1,506, 5,565 lb. ; Friesian, 22,664, 8,137 lb. ; Guernsey, 7,285, 6,271 lb. ; Jersey, 4,963, 6,137 lb. ; Lincoln Red, 2,955, 6,958 lb. ; Red Poll, 5,091, 6,785 lb. ; Shorthorn, 94,790, 6,831 lb. ; South Devon, 2,529, 6,259 lb. ; Welsh Black, 1,080, 5,597 lb.

Issue of Certificates. Of 255 Certificates of Merit issued for the period ended October 1st, 1928, 105 were in respect of cows which yielded 30,000 lb. or over of milk during the three-year period. This number included forty Shorthorns, twenty-three Friesians, nineteen Red Polls and ten Guernseys. The highest yields certified for the three years were 63,226½ lb., and 42,039¼ lb. given by pedigree Shorthorns, and 46,615 lb. given by a pedigree Friesian.

Register of Dairy Cattle. The number of cows which qualified in the milk-recording year ended October 1st, 1928, for entry in Volume XII of the Ministry's Annual Register of Dairy Cattle, which was published on June 15th, 1929, was smaller than in the previous year, being 13,539 against 15,558. Of the total number of cows which qualified for entry, 7,652 (or 56 per cent.) gave yields of 10,000 lb. or over.

The number of entries in the Register was again limited to 7,500 cows, so that only about 55 per cent. of the eligible cows of each breed were included in Volume XII. Of the cows entered, 6,312 yielded 10,000 lb. or over, while 1,804 yielded 12,000 lb. or over, of which 224 gave between 15,000 lb. and 20,000 lb. and 19 over 20,000 lb. in the year.

Rationing. There is perhaps no direction in which the keeping of milk records is of more practical value to an owner of cows than in affording information necessary for the economical rationing and improvement in the system of feeding of his cows.

Export of Live Stock to Countries Abroad.

Most countries have special regulations governing the importation of live stock, and intending exporters from this country can obtain from the Ministry information on the regulations in force at the time in any particular country. In many cases not only is a certificate required that the animal to be exported is healthy, but a further certificate must be furnished to the effect that the district from which the animal comes is free from certain diseases. The latter certificate is furnished by the Ministry, and the number of such certificates issued during the year ended March 31st, 1929, was 977, against 932 in the previous year.

The opening of the Quarantine Station at the London Docks in April, 1928, has led to important changes in the regulations of certain Empire countries, and cattle, sheep and pigs may now be exported, *via* the quarantine station, to the Union of South Africa, South West Africa, Northern and Southern Rhodesia, Kenya, Australia, Trinidad, the Irish Free State and Northern Ireland. The frequent prohibitions on such exports, imposed by most of these countries in recent years as a result of the outbreaks of foot and-mouth disease, will thus be avoided.

The number and declared value of cattle, sheep and pigs exported for breeding purposes from Great Britain and Northern Ireland to each country abroad are published each quarter in the *Journal of the Ministry of Agriculture.*

(*Continued at foot of next column*).

CLINICAL AND CASE REPORTS.

Cæsarean Section without Uterine Sutures.*

By W. J. Levy, Philadelphia, Pa.

Subject. Angora cat, six years old.

History. Dystokia, four days overdue.

Operation. Ether anæsthesia. Ventral median line, 2½ inch abdominal incision to within ½ inch of the umbilicus. We prefer in almost all cases the abdominal to the flank operation, and have never found that the section undertaken at this point offers an obstacle to the proper suckling of the young ; furthermore, it undoubtedly is of advantage in such cases as the one here reported, or in axial rotations of a horn or in cases of adhesions resulting from a previous Cæsarean section, etc., etc. After making the incision in the abdominal wall, our next procedure was the usual one of having an assistant press with both hands on the lateral walls of the abdomen, so as to cause the horns to protrude through the abdominal incision, the operator being thus assisted in lifting out the horns without the danger of tearing the broad ligaments. In this particular case it was found that one horn contained two dead fœtuses, whereas in the other horn a marked case of hydrometra was found to exist, appearing as a sausage-like mass 5 inches in length and 1½ inches in diameter. The body of the uterus likewise exhibited a hydrometra, being presented as a spherical mass about the size of a hen's egg. This enlargement was quite separate and distinct from the hydrometric horn. The horn containing the fœtuses was first incised, fœtuses removed and blood clots squeezed out. The incision was found to bleed freely, and involution of the horn appeared to be taking place normally, consequently the incision in the uterus was not sutured. In a number of cases where the uterus is in good condition we have dispensed with the suturing of the organ, and have obtained excellent results. The distended horn and body of the uterus were freely incised, the contents evacuated and cavity swabbed lightly out with Lugol's solution. These incisions were likewise not sutured. The uterus was permitted to remain exposed to the air for a period of at least five minutes, after which it was pressed back in the abdominal cavity and the omentum pushed well forward so as to guard against adhesion of the same to the cut surface. Interrupted sutures of the abdominal wall incision, ¼ inch apart, including all structures, were used. Five days later sutures were removed. Animal made a complete recovery.

The report on this case was primarily undertaken with the idea of acquainting veterinarians with the fact that

* *Veterinary Extension Quarterly*, University of Pennsylvania Bulletin, Vol. XXIX, No. 16.

(*Continued from previous column*).

The following table shows the total exports (exclusive of those to the Irish Free State) for the calendar years 1927 and 1928 :—

	1928		1927	
	No.	Value £	No.	Value £
Cattle ...	1,152	115,185	1,015	161,583
Sheep ...	3,044	54,539	1,986	41,915
Pigs ...	340	8,477	322*	6,376*

*Revised Figures.

we have been carrying cut for the past several years the practice of not suturing the incision or incisions in the uterus provided the organ is viable, as shown by the fact of bleeding freely when incised, and by appearing to be properly undergoing involution. Our observations lead us to believe that when the lips of the incision in the uterus are inverted and stitched, an area along the line of the sutures sloughs and a certain amount of putrescible matter reaches the cavity of the uterus.

Rat-Bite Fever from the Bite of a Pig.

Dr. R. P. Smallwood, of Chelmsford, records the following case in the *British Medical Journal* of June 29th, 1929:

"The following case is of so unusual a nature that it seems worthy of recording.

"On March 20th a woman, in feeding a small pig with a bottle, was bitten on the forefinger; the wound bled slightly and healed normally. On April 4th it began to swell and continued to swell and become increasingly painful for four days, on the last of which I saw it for the first time. The terminal phalanx was extremely swollen and tender, and I proposed to incise it, but for domestic reasons she wished it postponed to the next day. On April 8th it was excised freely under gas; no pus was found and there was very little bleeding at the time; it bled normally later and the pain was relieved considerably. Boric fomentations were applied, but there was no discharge, and the next day the wound was almost healed.

"On April 11th there was a red line of lymphangitis, a temperature of 101°, and the finger was more painful. Gas was given again and the wound was opened up more freely on both sides of the finger and at the root of the nail; a little clear serum escaped. The temperature did not subside, and she developed red nodules very similar to erythema nodosum along the arm and a few on the legs, abdomen, and neck. Owing to nursing difficulties she was moved into hospital and the arm kept in a eusol bath. The temperature then became normal, and remained so from April 16th to 20th, when it again rose to 100° and on the 21st to 104.8°. On April 22nd the temperature was 99 in the morning and normal by evening, and remained normal until April 25th, when it reached 100° in the evening.

"Sir William Willcox, to whom I mentioned the case, agreed that it was a case of rat-bite fever, though he had never heard of a case occurring as a result of a pig bite, and on his advice 0.6 gram of novarsenobenzene was given, after which the temperature fell to normal in twelve hours and has remained so. There was considerable desquamation of all the nodules and arm where the lymphangitis had occurred. Recovery was quite uneventful, except for an attack of urticaria two days after the injection."

ABSTRACTS.

[The Identification of *Brucella abortus* from Human Sources. DUNCAN (J. T.). *Trans. Roy. Soc. Trop. Med. and Hyg.* 1928. Nov. Vol. 22. No. 3. pp. 269-280. Ex. *Trop. Vet. Bull.*, Vol. 17, No. 1.]

Cases of undulant fever which cannot be traced to the goat have been reported from many parts of the world, and it is generally alleged that the source of infection is the cow, and occasionally the pig. But epidemiological evidence of a convincing nature has rarely been put forward, nor has the identity of the infecting organism been established beyond all doubt, although it is usually described, and possibly correctly so, as *Brucella abortus*.

In many cases agglutinin-absorption tests have been relied upon for the identification of *Br. abortus* recovered from man. But the results of different workers in this connection are not in agreement, and it appears to be inadvisable to rely upon this test solely.

Other features which help in the identification of organisms are: morphology, the atmospheric conditions necessary for artifical cultivation, the biochemical reactions and the pathogenic properties.

Contrary views have been expressed by different authors regarding the morphology of *Br. abortus* and *Br. melitensis*, but it must not be forgotten that BRUCE described the organism of undulant fever as a micrococcus, while BANG described that of contagious bovine abortion as a bacillus.

Duncan's experience is that when grown on agar or glucose agar the various species of Brucella show no very marked differences, but when they are cultivated upon a relatively rich medium such as peptic-digest blood agar *Br. abortus* may form distinctly bacillary forms which are three or four times as long as they are thick, while *Br. melitensis* and *Br. paramelitensis* usually retain the coccal shape. . . .

The author is of opinion that in the present state of knowledge it is inadvisable to accept unsupported evidence of agglutinin absorption tests as the means of identifying *Br. abortus*.

The pathogenicity of organisms for the guinea-pig may, under carefully controlled conditions, afford valuable information. The relative pathogenicity of *Br. melitensis* and *Br. abortus* as found in Rhodesia is now being investigated in that country.

The author reviews the cases of *Brucella abortus* infections in man reported from North America, Italy, and Rhodesia.

Within recent years undulant fever has been reported as occurring in countries formerly thought to be free. This may in part be due to more care in investigation and more accurate diagnosis. Duncan has come to the conclusion that in some areas, particularly Palestine and Rhodesia, the evidence points to the very recent appearance of a disease the carrier of which seems to be the milch cow and the causal organism *Br. abortus*. This disease is tending to spread.

"Except in northern Italy, where the cattle may be infected with *Br. melitensis*, there is nothing to suggest an extension from the endemic centres of goat-borne disease, but rather the development of a new pathogenic type, differing somewhat from the normal bovine variety of *Br. abortus* of northern countries (of which it may be a variant), but resembling closely the porcine variety."

Emphasis is laid upon the rôle possibly played by the cow in the dissemination of this type of infection.

[Bang's Disease in Equines. Production of Suppurative Lesions. RINJARD (P.) and HILGER (A.). *Bull. Acad. Vét. de France.* 1928. July. Vol. 1. pp. 272-279. Ex. *Trop. Vet. Bull.* Vol. 17. No. 1.]

While abortion in mares is almost invariably due to *Salmonella abortivo-equinus* there are cases on record which appear to have been caused by *Brucella abortus*. The object of the authors in publishing this paper is, however, to draw attention to *Brucella abortus* as a cause of suppurative lesions in equines.

Normally horse-serum agglutinates *Br. abortus* in strong concentrations only; it is therefore justifiable to consider reactions in dilutions above 1 in 50 as indicating actual infection. Such results coupled with bacteriological investigations furnish convincing evidence that *Br. abortus* is sometimes the cause of suppurative lesions in equines.

One of the authors was practising prior to the war in a stock-raising area where outbreaks of abortion were not encountered. In 1919, on his return, he found that large numbers of outbreaks were occurring, and serological tests showed that in practically every case *Br. abortus* was responsible.

it was also observed that suppurative lesions of the withers and poll occurred with far greater frequency than before, and no traumatism could be found to account for them. These cases occurred, moreover, on farms where abortion existed.

This coincidence having been observed, serum tests were carried out, and positive results were obtained, which indicated that the suppurative lesions were localisations in previously infected animals.

Fifteen cases have been investigated by agglutination tests, and in six of these, where pus was obtainable from unruptured lesions, cultural and inoculation tests have been carried out.

The authors have not produced poll evil or fistulous withers with the organism, but they have shown that subcutaneous inoculation with culture leads to the production of an abscess containing pus with the same characters as that obtained when naturally developed lesions are opened surgically.

REPORTS.

Ministry of Agriculture, Egypt: Report of the Director, Veterinary Service, for the Year 1926-27.

We are in receipt of a copy of the Annual Report of Ahmed Bey Farid, Director of the Veterinary Service for the year 1926-1927, although apparently it was only published this year. Amongst much of interest, it includes reports from the Directors of the Veterinary Pathological Laboratory, the Serum Institute and the Animal Breeding Section, as well as certain laws promulgated to give power compulsorily to immunise all cattle in Egypt against cattle plague by the double or simultaneous inoculation method.

A commencement was made in this scheme of double-inoculation in the Province of Assuan in Upper Egypt, where 2,936 cattle were vaccinated with a death rate of only 1·7 per thousand. A grand total of 20,173 cattle were submitted to the same inoculation during the year, and it is stated that no deaths resulted from cattle plague, and only 43 from other causes following inoculation, or a death rate in inoculated cattle of only ·21 per cent. This result speaks highly of the serum and the manner in which it was used. It is satisfactory to note that no deaths occurred in any part of Egypt from cattle plague during the year under review; a tribute to the Veterinary Service, both past and present.

Fifty-nine cases of rabies were reported, showing that this disease is still widespread in Egypt.

Glanders has evidently once again become a menace, for no less than 200 cases are recorded. This must be very disquieting to the authorities, for the disease had been nearly stamped out in recent years: for instance, we note that only 16 cases occurred in the year 1921-1922. The causes of the increase are not stated, but with the incidence of motor transport as in other countries, and the consequent decrease of the cab horse of the large towns, in which class of animal the disease was always most frequent, the figure quoted must be considered unsatisfactory.

The work of the pathological laboratory is evidently given an important place in the Service, for the Director appears to have six assistants, two of whom, however, were studying in Europe at the time the report was written. A detailed table as to the source of the 2,232 specimens received at the laboratory is given, special columns even being allotted to material from oxen, cows, bulls, calves, horses, mares, cocks, chickens, fowls and several other animals. What strikes one as rather curious is that only one out of all this number was found positive to bovine tuberculosis, although the disease is known to be extremely common amongst Egyptian cattle. Eight hundred and eighty-three of these specimens were found to be negative. By far the most numerous specimens seem to have been those of piroplasmosis of cattle, of which 789 were of Egyptian fever and 234 of Texas fever.

The Director of the laboratory describes at some length the method used in carrying out the complement fixation test for glanders, which he uses along with the agglutination test. As no mention is made in the whole report of mallein being used, it would appear that this well-known test is no longer utilised by the Egyptian Veterinary Service.

The work of the Serum Institute, where chiefly anti-cattle plague and to a lesser extent anti-septicæmia hæmorrhagica sera are made, appears to have been well performed and no less than 129,446 units of the former were manufactured. In order to supply a special quantity of this serum to the Palestine Government, the number of serum-producing bulls was increased from 97 to 252 during the year. The practice of examining all virulent blood issued for possible piroplasmosis has been continued and seems to have been carefully carried out, for no less than four separate microscopic examinations are made before any such blood is used. Tables are also given of several tests carried out to test the potency of the serum produced, susceptible cattle being used for all tests.

The annual report concludes with statistics giving the census of farm animals in Egypt and the numbers killed in the different abattoirs up and down the country. The whole makes interesting reading, showing the activities of the Veterinary Service in Egypt at the present time and the important position it still holds in the country.

Civil Veterinary Department, Punjab; Veterinary Bulletin No. 1: Report of the Officer in charge of the Camel Specialist's Office, Sohawa, for the year 1927-28.

Experiments have been continued in the treatment of surra in camels by giving various doses of tartar emetic with Bayer 205. Out of 142 camels so treated, 137 were able to return to work and later reports from their owners

(*Continued at foot of first column next page.*)

From The Veterinarian, February, 1829.

Our readers will possibly recollect, that, in September last, we gave an account of an action against a veterinary surgeon at Bristol, for unskilfully bleeding and destroying a horse. The facts, as related to every reporter, were so extraordinary, that we were led to remark, "There is something in the case passing strange, and the veterinary public will claim an explanation from the parties concerned: until opportunity is given for that explanation we are silent."

It appears that this remark, together with "similar calls from other quarters," has induced Mr. Kent (the defendant) to publish a pamphlet, under the title of "Barrister's Notes of Evidence, in the action of Nisbett *versus* Kent," a copy of which he has sent to us, with an accompanying letter, wherein he says, "he trusts we shall find sufficient, on the perusal of the publication, to exculpate him."

We regret that Mr. Kent should have carried our meaning beyond the limit set to it; at the same time, we feel reason (and we think Mr. Kent ought equally so) to rejoice at the consequences to which such comment has led, *viz.*, the publication to the veterinary world in general, and to Mr. Kent's employers and friends in particular, of a correct detail of the evidence elicited on the trial, than the perusal of which, as set forth in the pamphlet, nothing further, we will take upon ourselves to affirm, is wanting, completely to exculpate Mr. Kent from the charge of badly, ignorantly, unskilfully, inartificially, or carelessly bleeding the horse in question.

Mr. Kent's account of the operation is as follows:—

"On the 20th of June, the horse in question was brought to my yard by the plaintiff's son or brother, a youth about twenty years of age, who requested me to bleed it, which I proceeded to do. I operated on the off or right jugular vein, with a human lancet, which instrument I have constantly used for thirteen or fourteen years, by which I obtained a regular flow of blood at the first puncture, and took away seven pounds, without the slightest circumstance occurring to excite suspicion of anything irregular in the operation. As the blood issued from the orifice, Nisbett observed, that it was peculiarly black, to which I replied it was. Having obtained as much blood as I wished, I proceeded to close the orifice in the usual manner, with a pin and a tow; but the horse resisting my efforts, I directed one of my servants to apply a twitch, and then effected my purpose of securing the orifice. Up to this period no thrombus or swelling whatever had taken place, but immediately on the ligature being applied, I observed a filling of the cellular tissue beneath the orifice, and ordered my servant to apply cold water to it for a few minutes. The swelling or thrombus was so slight, that no one present would have been aware of its existence, had not I directed attention to it. I retained the horse, until I was quite satisfied that the thrombus ceased to enlarge, and then gave instructions to Nisbett to lead the horse quietly home, a distance of about a mile and a quarter, and to apply cold salt water over the part occasionally, when he got home. When he left my yard, the thrombus did not contain more than six ounces of extravasated blood. Here my personal knowledge terminates, as I never saw the horse after he left my yard; but between two and three hours from that time, I heard that he had fallen down, and died instantly, about a mile from my yard; and shortly after, Nisbett, jun., who brought him to be bled, came and requested me to go to him, as his father wished me to remove him; but I replied that I had no means of removing him and declined going; and observed, that had he applied while the horse was alive, I should have been most willing to go and render assistance, and that if his death was connected with the bleeding, I had no doubt but I could have counteracted what was amiss, but as he was dead, my attendance could not be of any use; with which conversation our interview terminated. On the evening of the 21st (the day following) I received a letter from an attorney, to demand fifty guineas as the value of the horse, requiring payment of the sum by three o'clock of the 23rd inst, and menacing me with an action on failure of compliance."

We perfectly acquit Mr. Kent of unskilfulness; but we could have wished that, in some few points, he had acted a little differently.

We cannot understand why he peremptorily refused to go to and examine the horse, when requested to do so by young Nisbett. He says, that "had he been applied to while the horse was alive he should have been most willing to go and render assistance." How could Nisbett have thus applied to him, when, according to Mr. Kent's own account, the horse "fell down, and died instantly?"

Although his attendance could not have been of any use, so far as life was concerned, the inspection of the carcase might have thrown some light on the cause of death; and probably Mr. Kent would have seen, and have been able to describe, that which would have been satisfactory to old Nisbett. There would, at least, have been the appearance of good nature about it, or, we would rather say, it would have been an act of justice to a person who had been suddenly and mysteriously deprived of a useful animal. Mr. Nisbett had a right to require it, and to feel a little angry when Mr. Kent so hastily and cavalierly refused.

We know too well how many circumstances occur in our profession, to make us a little ill-tempered at times; and, therefore, we will not too severely censure Mr. K., although we are sorry that he should probably have brought this business upon himself. At all events, he would have been enabled to repel with more effect the evidence of the old illiterate farrier, Davis; and to state that on the day of trial which would have been of paramount importance. So far, and no farther, does any part of the transaction appear to reflect on the conduct of Mr. Kent. We believe that "the operation was properly performed, and this," as Mr. Kent judiciously observes, "was the turning point between plaintiff and defendant."

In the account of the trial, Mr. Kent is unnecessarily, and, we think, injudiciously, and unjustifiably severe, Even old Davis does not deserve all that is said of him. much less Mr. Leigh. The allusion to Mr. Williams's personal appearance is in sadly bad taste; and the publication of the opinion of the junior counsel respecting Mr. Williams's opening speech, incautiously given, and evidently meant only for the private ear, will admit of no defence. We will not, however, press this matter further. Mr. Kent has suffered (in pocket) more perhaps than he deserved, and much more than we wish. Even the successful termination of a suit at law costs somewhat too much. In professional reputation, we trust he will not, because we feel that he ought not so suffer.

The case, on the whole, is interesting to the profession; and, for this reason, we recommend the perusal of Mr. Kent's pamphlet. The subject is well treated, and the several bearings of the evidence commented on with considerable talent.

(*Continued from previous page.*)

showed that with the exception of one, which died from some other cause, all were able to continue at their normal work.

Treatment of equines suffering from surra was carried out on similar lines with a considerable amount of success and the reports are said to be encouraging.

No evidence could be found that surra is transmitted to the offspring of an infected mother, either *in utero* or through the medium of her milk.

The report ends with the statement that the embryos of Filariæ so frequently present in the circulation in camels' blood are always present when the disease exists, and are not intermittent, as is the case with trypanosomes.

The Far-Eastern Veterinary Medical Association.*

A Successful First Year.

A meeting of the Far-Eastern Veterinary Medical Association was held at Malacca on the 2nd and 3rd March, 1929, when the following members were present: Messrs. R. Macgregor, K. D. Turner, G. B. Purvis, W. Rutherford Wallace and R. A. B. Stanhope (Hon. Secretary and Treasurer). Mr. Stanhope was elected as Chairman.

Apologies for absence were received from Messrs. Rocker, Forbes, Symonds, Short and McCrae. Messrs. Simpson and Fleury were away on leave.

The Minutes of the last meeting were read and confirmed.

Registration Enactment. The Secretary produced a copy of the Straits Settlements Enactments for the registration of medical practitioners and dentists, and stated that the Federated Malay States Enactment practically made the Colony Enactment legal for the F.M.S.

After some discussion it was agreed that a similar Enactment for Veterinary Surgeons was desirable, and Mr. Macgregor and the Secretary were asked to draw up such an Enactment and present it for the next meeting, with a view of later suggesting it to Government. The following points were to be included: the registration board to be the senior Government Veterinary Surgeon in the Colony and in the F.M.S.; and the qualifications necessary, the M.R.C.V.S., equivalent Dominion or Colonial University degree, Indian Veterinary College diploma, or such other equivalent degree or diploma as may be gazetted by His Excellency; candidates for registration to be interviewed by the Registrar or Board, and registration liable to be cancelled, subject to an appeal, if holder proves unsuitable.

London College Re-building Fund. The Secretary stated that $138 had been collected for the London College Re-building Fund. It was agreed that this be brought up to a round sum ($150) from the Association funds and the amount forwarded.

Essay Competition. The silver cup purchased as first prize for the essay competition was exhibited. The Secretary stated that the cost of this had exceeded the amount authorised, by the cost of engraving. It was agreed that the extra cost be paid by the Association.

The Secretary read the Judges' report and announced that the first prize had been won by Mr. M. C. E. Rebello (Assistant Veterinary Surgeon, Kuala Lumpur), and that the essays by Messrs. R. S. Narayanan, Alor Star, and G. Thiagarajan (Ipoh abattoirs), were highly commended.

It was decided that the competition should be held annually, and Mr. Wallace and Mr. Turner were asked to draw up a scheme and suggest subjects for next year.

Disease Prevention Rules. The Secretary reported that he had written, through the Senior Medical Officer, Negri Sembilan, enquiring whether any action had been taken following the recommendations of the November, 1926, conference on amending the Rules under the Quarantine and Prevention of Diseases Enactment, and was informed that nothing had been done so far, but that the then principal medical officer was waiting a favourable opportunity to bring forward a new Enactment drafted in 1922. The Secretary stated that he wrote in reply to this, suggesting another conference of Veterinary Surgeons completely to re-draft the Rules dealing with veterinary matters, but had had no reply.

The Secretary suggested that, especially following the appointment of a new Principal Medical Officer, it might be advisable to have a further meeting dealing with this, in order that the members' views might be more or less unanimous. He offered to draft out new Rules, etc., as a paper for the next meeting. This was agreed to, Mr. Purvis also offering to help.

First Annual Report.

The Annual Report and Financial Statement were received and adopted. Mr. Stanhope's report was as follows:—

The Association has passed through the first year of its life satisfactorily, and should now be well established and capable of carrying on a successful existence. The meetings serve to bring the members together and into touch with one another, and to allow discussion and exchange of views on professional subjects, departmental duties, and other matters such as was not possible before.

The membership reached thirteen for the year, and we should be able to add one or two more to the number during the coming year, as well as perhaps to commence to enrol associate members amongst the assistant veterinary surgeons and veterinary inspectors. The Association has been recorded, under the Societies Enactment, in the States of Negri Sembilan and Perak, and exempted from registration in the Straits Settlements (except for the Dindings); and also has affiliated with the National Veterinary Medical Association of Great Britain and Ireland.

Financially the Association is in a sound condition, the expenses for the year being only little more than half the subscriptions received. The largest item of expenditure is the duplication and circulation of the proceedings of the meetings and of the papers discussed. I hope to be able to cheapen this this year. The collection for a donation to the Royal Veterinary College (London) Building Fund reached $135, and in addition the Penang Turf Club and the Perak Turf Club were induced by members to send donations direct.

Two meetings were held during the year, an inaugural meeting in Seramban and an ordinary meeting at Ipoh. At each the attendance was fair, but it is hoped that more members will be able to attend in future. The professional subjects on which papers were presented and discussed were: "Rinderpest in Pahang," by Mr. R. Macgregor; "Improvement, for Milk Production, of Local Breeds of Cattle," by Mr. G. B. Purvis; and "Rabies in Malaya," by Mr. R. A. B. Stanhope; and a demonstration on the "Collection and Identification of Parasites from the Alimentary Canal" was given by Mr. Purvis.

Election of Office Bearers.

President. Mr. Stanhope proposed that Mr. Simpson be re-elected as President, in view of the efforts he had made to get the Association established, and of the fact that it would also be his last year in service in Malaya. This proposition was seconded by Mr. Macgregor, and carried with enthusiasm.

Committee. Messrs. Wallace and McCrae.

Hon. Secretary and Treasurer. Mr. Stanhope (re-elected).

* Affiliated to the National Veterinary Medical Association of Great Britain and Ireland.

Pension Rights. Mr. MACGREGOR drew attention to paragraph 13 of the new General Regulations under the Pensions Enactment, 1928 (Notification No. 254 of F.M.S. Government Gazette of 11th January, 1929) *re* pension rights of officers allowed private practice, and asked whether this affected us, the members of the profession. It was decided, after discussion, that it probably did not, but that it would be advisable for the Secretary to write and enquire from Government.

Carriage of Swine. Mr. TURNER raised the question of the method by which pigs are usually carried here, and the Cruelty to Animals Enactment, and mentioned the carrying of pigs to Sungei Lembeng in Pahang. This was discussed, and reference was made to the commission of a few years ago on this subject and their report; but it was admitted that trouble was sometimes met with in getting this carried out, the ruling being rather indefinite.

Exhibits. Mr. TURNER exhibited some photos of Siamese buffaloes, taken from amongst those purchased in Siam in connection with the Pahang flood relief fund.

Mr. MACGREGOR showed two old Pahang papers of 1907, one a report by Mr. Falshaw, then Government Veterinary Surgeon, Singapore, on "Cattle Breeding in Java," and the other a report on anti-rinderpest serum inoculation of buffaloes at Kuantan.

Mr. Purvis stated that he was getting some cattle dip for a herd of cattle in North Perak, and that he had a copy of the complete plans and specifications of a cattle dip as used in Africa, and would be pleased to lend them to anyone requiring them.

Next Meeting. It was agreed to hold the next meeting in Kuala Lumpur towards the end of June or early in July.

Paper. Mr. Wallace then introduced his paper on "Acute Enzootic Hæmorrhagic Septicæmia of Buffaloes, with special reference to the recent outbreaks in South Perak."

[This paper, together with the discussion which ensued, and the author's reply, are reproduced at the commencement of this issue of the *Record*.—Ed.]

Following the discussion and reply, a hearty vote of thanks was accorded Mr. Wallace.

Mr. PURVIS brought up the subject of hæmorrhagic septicæmia of buffaloes in general, and especially the possibilities of mistaking it for rinderpest. He quoted some old reports and papers, and several extracts from the writings of workers in other countries. A long discussion followed, other old reports being quoted also. Mr. Purvis was thanked for his contribution and for his work in searching through the old papers and other writings.

A vote of thanks was passed for forwarding to Mr. Coleman, the headmaster of the Malacca High School, for his kindness in allowing the Association the use of a room in the school for the meeting.

At midday a visit was paid to the abattoirs during the slaughtering of cattle, and a few cases of foot-and-mouth disease in pigs were seen. A visit was also paid to the cattle quarantine station. A second visit to the abattoirs was made at 1 a.m. to witness the slaughtering of pigs by the "spike" method in use there.

At 5 p.m. an enjoyable drive was taken round the old and historical "Town and Fort of Malacca," many of the old relics or monuments being visited or pointed out.

R. A. B. STANHOPE, *Hon. Secretary.*

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Aug. 31st to Sept. 6th.—N.V.M.A. Congress at Ayr.
Aug. 26th—Meeting of the **Finance Committee,** N.V.M.A., at 3-45 p.m., and of the **Editorial Committee,** at 4-30 p.m., both at 10 Gray's Inn Square, W.C.1.

CONGRESS ITEMS.

To facilitate the work of the Local Secretary (Major A. Douglas, 17 Wellington Square, Ayr), members who will be attending the Congress of the Association at Ayr are urged to complete and send to him at the earliest possible moment the blue application forms for tickets (for the various functions) which have been issued with the last two numbers of the *Record.*

The music at the Whist Drive and Dance in Western House on Saturday, August 31st, and at the President's Reception on Monday, September 2nd, will be provided by the *Arcadians Amateur Dance Band,* which Mr. R. Ewing Johnston, M.R.C.V.S., D.V.S.M., their leader, is bringing over from Belfast for the occasion.

MASONIC MEETING.

The St. Paul's Lodge, Ayr, will hold a regular meeting on Monday, September 2nd, and we are asked to state that members of the Association who are Masons will be heartily welcomed. Particulars as to time and place can be obtained from the Local Secretary's office, at the Congress.

PERSONAL.

Will. Mr. William Edwin Bovett, of George Street, Bridgwater, veterinary surgeon, vice-president of the Western Counties Division of the National Veterinary Medical Association, and a prominent Freemason, left £2,581.

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Appointments. The following are amongst the appointments made by the Secretary of State for the Colonies during the month of July, 1929:—

Capt. H. M. Stuckley, B.V.Sc., as Government Veterinary Officer, Agriculture Department, Fiji; Mr. S. Simpson, M.R.C.V.S., as Veterinary Officer, Gold Coast.

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Major P. D. Carey has been appointed States' Veterinary Officer to the Government of Guernsey, following upon the resignation of Lt.-Col. Maxwell St. Glasse Glasse.

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Dr. T. W. M. Cameron, M.A., B.Sc., Ph.D., M.R.C.V.S., is shortly leaving the London School of Hygiene and Tropical Medicine to take up an appointment as Lecturer in Helminthology in the Department of Zoology of the University of Edinburgh and the Royal (Dick) Veterinary College.

Shropshire and the Milk Grades Muddle.

At a recently-held meeting of the Shropshire County Council, the Public Health Committee reported that, being of opinion that the relative values of the various grades of milk were not realised under the present designations of 1, "Certified"; 2, "Grade A (Tuberculin Tested)"; 3, "Grade A"; and 4, "Pasteurised"; had decided to support a resolution of the Cambrideshire County Council in favour of some alteration being made so that members of the public might more easily recognise which was the highest grade of milk.

In Parliament.

Deaths from Bovine Tuberculosis. Dr. Fremantle asked if the Minister of Health was aware that over 2,000 infants died every year from bovine tuberculosis. Miss Lawrence said the Minister of Health was advised that it was not possible to ascertain precisely how many infants died each year from bovine tuberculosis, but such evidence as was available suggested that the number was less than that given in the question. Bovine tuberculosis was mainly conveyed by milk, but she had no information to support the figure of £9,000,000 a year which Dr. Fremantle calculated to be the expenditure on treatment, convalescence, and after-care of this disease in infants. Dr. Fremantle suggested that measures should be introduced to secure that only milk free from tubercle should be given to infants attending the 3,000 existing infant welfare centres. Miss Lawrence replied that dried milk was supplied at most of these centres. This was recommended by the Ministry of Health in any case in which the ordinary milk supply was of doubtful quality. A few local authorities supplied tuberculin-tested milk, but it would not be practicable to require such a supply in every case, nor would such a requirement be justified having regard to the many available supplies of dried milk of reliable brands.

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The House of Commons was recently informed that during 1928 in England and Wales 161,412 cows were examined under the Tuberculosis Order of 1925, and 13,832 cows were slaughtered.

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Mr. Buxton states that the International Veterinary Bureau, which exists to secure co-ordination of research into foot-and-mouth and other serious animal diseases, has recommended that Governments shall consider the exchange of specialists engaged in such research work.

The 89th Annual Show of the Royal Agricultural Society will be held in Manchester, from 8th to 12th July, 1930.

CORRESPONDENCE.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.
All correspondence must bear the name and address of the contributor for publication.
The Editor does not hold himself responsible for the opinions of his correspondents

The Detection of Tuberculous Cattle.

To the Editor of The Veterinary Record.

Sir,—In his interesting article on the detection of tuberculous cattle, etc., Mr. H. L. Torrance makes the assertion that tuberculosis in the calf may be hereditary, congenital, or acquired.

The question whether a bacterial disease can be hereditary is an interesting one, and I have always been under the impression that in order for a disease to be classified as "hereditary," it would have to be transmitted from generation to generation via the ovum. No less an authority than Professor Calmette, in his well-known book on Tuberculosis in Man and Animals, maintains that an ovum containing tubercle bacilli loses its germinating properties, and does not arrive at maturation. He quotes experiments whereby Gærtner introduced tubercle bacilli directly into the testicles of rabbits and guinea-pigs which, on being coupled with healthy females, produced offspring none of which was found infected. As to the disease being hereditary in human beings, Calmette states that "many physicians succeed only with difficulty in emancipating themselves from prejudice in favour of the heredity of tuberculosis, while the belief is so widespread among the general public that it will probably require long efforts of education to replace it with scientific truth!"

Fœtal infection is, of course, possible via the placenta, but such a condition would be "congenital" rather than "hereditary." I am aware that it is possible for bacterial disease in poultry to be passed from parent to offspring through the egg, but that again does not necessarily indicate infection of the ovum.

Is tuberculosis in cattle ever hereditary?

Yours faithfully, D. J. Anthony.

Veterinary Dept.,
Marsh & Baxter, Ltd.,
Brierley Hill,
Staffs.,
17*th Aug.*, 1929.

Clover Sickness.

To the Editor of The Veterinary Record.

Sir,—The description of the symptoms in the case reported of this malady by Major Chambers does not tally in any way with what I observed many years ago in an outbreak among four or five horses belonging to gypsies, which broke into a fine field of clover belonging to a client of mine.

The animals were in the field all night and, on being discovered in the early morning, were promptly shut up in a barn. During the day I was sent for to see them as two or three were ill.

The symptoms shown were great depression, sleepiness, staggering gait, coldness of skin, diarrhœa, and inappetance. The animals wasted very rapidly, and one died.

In Fröhner's "Toxicology for Veterinary Surgeons" it is stated that poisoning of horses from exclusive feeding on Swedish clover (*Trifolium hybridum*) is sometimes observed, and is probably due to the presence of fungi (particularly *Uromyces apiculatus*). The symptoms consist in stomatitis, salivation, and a dermatitis affecting the white parts of the skin, together with those pointing to intoxication.

Cases.

Five horses received for some time exclusively flowering Swedish clover. Three old horses became gravely ill, while two foals remained sound.

The horses stood in the field sleepily, with hanging heads; they took at times a mouthful of grass without swallowing it, and showed a clinical picture like subacute inflammation of the brain. The mucosæ of the mouth and eyes were orange-yellow coloured. On the mouth mucosa were seen areas where the epithelium was lost. The gait was weak and stumbling, watery diarrhœa was present, and the animals were extraordinarily weak and wasted. One horse died suddenly on the third day, both the others recovered later.

Two horses died after feeding on Swedish clover. They showed loss of appetite, nervous depression, staggering gait, orange-red colour of connective tissue, frequent urination, colic, as well as necrosis of patches of mucosa of the tongue. Another horse showed general paralysis, inability to swallow, and coma. Yours truly, W. R. Davis.

The Editor acknowledges the receipt of the following:—

Report of a meeting of the Midland Counties Division, from Mr. H. J. Dawes, Hon. Secretary.

Communications from Mr. O. V. Gunning (Tutbury), Major D. S. Rabagliati (Wakefield), Mr. O. Stinson (Appleby) and Prof. G. H. Wooldridge (London),